

BASE FROM U.S. GEOLOGICAL SURVEY, 1963

SCALE 1:250,000



GEOCHEMICAL MAP SHOWING THE DISTRIBUTION AND ABUNDANCE OF COBALT, CHROMIUM, AND NICKEL IN THE OXIDE RESIDUE OF STREAM-SEDIMENT SAMPLES IN THE BIG DELTA QUADRANGLE, ALASKA

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EXPLANATION

GEOLOGY GENERALIZED FROM WEBER AND OTHERS (1978)

CORRELATION OF MAP UNITS

UNCONSOLIDATED DEPOSITS		IGNEOUS ROCKS	
Qac	QUATERNARY	Tg	TERTIARY
Qaf		Tt	TERTIARY OR MESOZOIC
Qd		Tmg	
Qe		Kg	CRETACEOUS
Qm			
SEDIMENTARY ROCKS		METAMORPHIC ROCKS	
Tac	TERTIARY	Pg	PERMIAN
Td		Pu	PALEOZOIC
		Pc	
		Pz	
		Ppa	PALEOZOIC AND CRETACEOUS
		Pps	
		Pps	

DESCRIPTION OF MAP UNITS

Qac	ALLUVIUM, COLLUVIUM, AND MINOR GLACIAL AND EOLIAN DEPOSITS
Qaf	ALLUVIAL FAN AND GLACIAL OUTWASH DEPOSITS
Qd	DUNE SAND
Qe	MORAINAL DEPOSITS
Qm	MORAINAL DEPOSITS
Tac	NENANA GRAVEL AND COAL-BEARING FORMATION
Td	DETRITAL ROCKS
Tg	IGNEOUS ROCKS
Tt	FELSIC TUFF AND LAVA
Tmg	GRANITE AND QUARTZ MONZONITE
Tmg	UNDIVIDED GRANITIC AND DIORITIC ROCKS
Tmg	UNDIVIDED GRANITIC AND MINOR DIORITIC ROCKS
Ng	UNDIVIDED GRANITIC AND MINOR DIORITIC ROCKS
Pg	GREENSTONE AND CHERT
Pu	ULTRAMAFIC ROCKS
Pc	CATACLASTIC SCHIST AND GNEISS
Pz	GREENSCHIST, QUARTZITE, MARBLE, COARSE META-ARENITE, GREENSTONE, AND META-TUFF
Ppa	QUARTZITE, SLATE, CALC-PHYLLITE, AND MARBLE
Pps	AUGEN GNEISS AND MINOR AMOUNTS OF OTHER GNEISSIC ROCKS
Pps	GNEISS, SCHIST, AUGEN GNEISS, AMPHIBOLITE, AND MARBLE

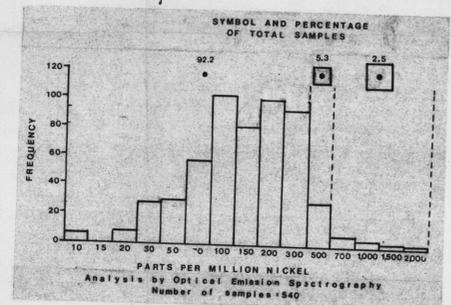
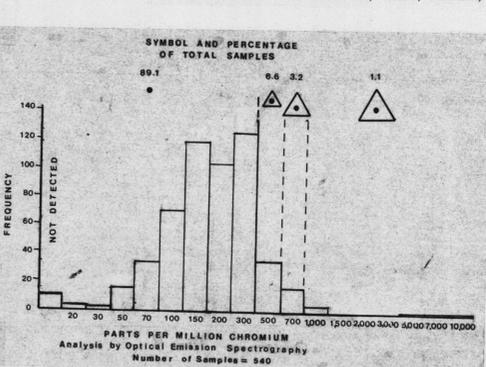
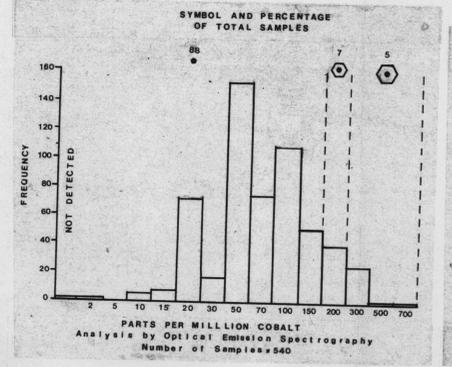
GEOLOGIC SYMBOLS

---	CONTACT, APPROXIMATELY LOCATED
---	FAULT OR PROBABLE FAULT, DOTTED WHERE CONCEALED

GEOCHEMICAL SYMBOLS

•	SAMPLE SITE--Represents background values at sites where there are no anomalous values
○	ANOMALOUS VALUES--Explained on histograms
○	COBALT
△	CHROMIUM
□	NICKEL

BACKGROUND INFORMATION RELATING TO THIS MAP IS PUBLISHED AS U.S. GEOLOGICAL SURVEY CIRCULAR 783 AVAILABLE FREE OF CHARGE FROM THE U.S. GEOLOGICAL SURVEY, RESTON, VA. 22092



DISCUSSION

This map shows the distribution and abundance of cobalt, chromium, and nickel in the oxide residue (secondary iron and manganese oxide coatings) of 540 stream-sediment samples collected in the Big Delta quadrangle in 1975 and 1977. This sampling was a part of geochemical studies made for the Alaska Mineral Resource Assessment Program. Stream sediments were collected from the active channels of streams draining areas ranging from approximately 10 to 25 km². The areas within the quadrangle that show a low density of sample sites, particularly along the major northeast-trending fault and in the southwestern and south-central parts of the quadrangle, were areas where dense brush and trees prevented helicopter because they are covered by thick unconsolidated deposits of Quaternary material, which limits effective geochemical sampling within the scope of the present geochemical studies.

The secondary iron and manganese oxide coatings, cement, and particles in stream sediment (denoted as oxide residue) are considered concentrators of elements that have been leached from bedrock and colluvium and are migrating as ions in solution. The oxide residue of stream sediment contains the secondary iron and manganese oxide components of stream sediment together with adsorbed or coprecipitated trace elements and a diluent of silica and alumina derived from clays. These components are extracted from the -80 mesh sediment using a weak oxalic-acid solution (Almains and Mosier, 1976). The leachate residue produced by this extraction process is a derivative sample representing one material component of the total stream sediment.

The stream sediments were air-dried and sieved through an 80 mesh (0.2 mm) screen. The oxide residue of the stream sediment was obtained by leaching a 5 gram split of the -80 mesh fraction of the sediment with oxalic acid as described by Almains and Mosier (1976). This material was analyzed for 19 elements including cobalt, chromium, and nickel by semi-quantitative emission spectrography (Grimes and Marranzino, 1968). Map plots and histograms were produced from the analytical results. The range of anomalous values for each element was determined from the histograms and was subdivided into two or more plotting intervals represented by the symbols on the map and histograms.

Complete analytical data for all of the sample sites shown on this map are available in a U.S. Geological Survey Open-File Report by R. M. O'Leary and others (1978).

REFERENCES CITED

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